

# PATENT SPECIFICATION

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DRAWINGS ATTACHED



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## (54) IMPROVEMENTS IN OR RELATING TO BATHS

(71) I, HARRY GRIMSHAW PRESTON, a British subject, of 42 Ferrybridge Road, Knottingley, Yorkshire, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to baths of the type provided with an opening in one side to facilitate entry and exit and a sliding door to effect sealed closure of the aperture. Such baths will hereinafter be described as "of the type referred to".

The object of the invention is to provide such a bath with means for facilitating the movement of the door with respect to the aperture.

According to the present invention, a bath of the type referred to comprises a horizontal guide for the door, a double-acting hydraulic cylinder and piston in operative connection with the door to effect its movement along the guide, a reservoir, a manually operated pump having its inlet connected to the reservoir, a reversing valve connected to the outlet of the pump and providing for alternate connection of either end of the cylinder to the outlet of the pump and of the other end to the reservoir.

Depending on the setting of the reversing valve, the operation of the pump causes the cylinder and piston to effect closing or opening of the door. By appropriate relation of the pump delivery to the swept volume of the cylinder, the effort required to operate the pump can be made quite slight compared to the frictional resistance of the sliding door. The door may therefore be easily operated by the aged or disabled, to whom the easy entry and exit afforded by the sliding door makes the bath particularly suitable.

To enable the pump to be readily accessible to a person in the bath, since the closing of the door must be effected after entry and the filling of the bath with water, and the opening after draining the bath (at

least to the bottom of the opening) before exit, the pump is preferably provided with a pivoted operating lever extending above the rim of the bath. Likewise, the reversing valve must be similarly accessible, and can therefore be provided with setting means extending above the rim. If the bath is two-level, providing a seat, the operating and setting means should be accessible from the seat.

In a preferred embodiment, the cylinder and piston are disposed horizontally at the mid-height of the door. Above the cylinder is a reciprocating pump, with its axis horizontal, and above this a reservoir, connected through a non-return valve to the pump inlet. At one end of the pump, a pivoted lever connected to its piston extends upwardly and terminates in a knob. Beyond the other end of the pump is disposed a reversing valve with an upwardly extending operating stem with a knob, rotatable or sliding to effect reversing. The inlet to the reversing valve is connected through a non-return valve to the pump inlet. Depending on the setting of the valve, its inlet is connected to one or other end of the door-operating cylinder, the other end of which is then connected through the valve to the reservoir.

The invention will now be further described with reference to the accompanying drawings, in which:—

Figure 1 is a front elevation of a bath with a front panel removed to expose a sliding door and hydraulic operating mechanism;

Figure 2 is a section taken on the line 2—2 of Figure 1; and

Figure 3 is a plan of the bath.

The bath proper 1 has an opening 2 of width A formed in its front side 3 near one end, and an outer panel 4 along the front side has a corresponding aperture 5. A sliding door 6 is disposed between the front side 3 of the bath and the front panel 4 and is movable along a guiding and supporting ledge 7 from an open position as shown in Figure 1 to a position in which it closes

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the aperture 2 (Figure 3). Down the vertical sides and across the bottom of the margin of the opening 2, a sealing strip 8 is let into a groove, to bear against the inner face of the door in its closed position. At its rear edge 9 the door 6 is connected at 10 to the piston rod 11 of a piston 12 in a double-acting hydraulic cylinder 13 contained between the front 3 of the bath and the front panel 4. In the same space is mounted a pump 14, manually operated by an oscillating lever 15, which extends upwardly through a slot 16 in the rim 17 of the bath, to end in a knob 18. Adjacent to the pump 14 is a reservoir 19 connected by a pipe 20 to a valve chest 21 of the pump, containing a non-return inlet valve and a non-return valve leading to a delivery pipe 22, which extends to a reversing valve 23 operated by a vertical setting plunger 24 ending in a knob 25 above the rim 17. A return pipe 26 extends from the reversing valve 23 to the reservoir 19. From the reversing valve pipes 27, 28 extend the respective ends of the hydraulic cylinder 13. The reservoir 19 need only be quite small, because its capacity need be little more than the difference between the full-bore displacement to the left-hand side of the piston 12 in the cylinder 13 and the smaller displacement arising to the right-hand side arising from the presence there of the piston rod 11.

With the reversing valve 23 set (as shown) to connect the pump delivery pipe 22 to the pipe 28, operation of the pump by the lever 15 causes the piston 12 and the pump to move to the right, so as to propel the door 6 to closed position. This takes place after a user has entered the bath through apertures 2 and 5 when the door 6 is withdrawn, the knobs 18 and 25 being in a convenient position for actuation by the user inside the bath, whether seated on the actual bottom or on a seat in a two-level bath. Then, when the door is closed, water can be introduced to any desired level, the door being sealed by the strip 8.

When the water has been drained from the bath, at least to below the level of the bottom of the aperture 2, reversal of the valve 23 enables the door 6 to be withdrawn by operation of the pump 14 by the lever 15.

By the leverage provided by the lever 15, and by having the bore of the pump 14 less than that of the cylinder 13, only a slight

effort needs to be applied to the lever 15 to move the door 6 in either direction.

This self-contained manually operated and controlled hydraulic system is capable of being formed as a unit, fitted between the front 3 of the bath proper and the front panel 4 of the bath. If the bath is of fibre-glass or sheet plastics material construction, such front panel may be integral with the bath proper 1. The sliding door 6 when open, disappears between the front 3 and the front panel 4. Further horizontal guides may be formed between them, to supplement the support guide 7.

The front panel 4 may, however, be separate from the bath proper 1, e.g., if the latter is of cast iron construction, but firmly supported from the front side 3 of the bath, to provide support for the door 6 as the latter is thrust into bearing with the sealing strip 8 round the opening 2.

#### WHAT I CLAIM IS:—

1. A bath of the type referred to comprising a horizontal guide for the door, a double-acting hydraulic cylinder and piston in operative connection with the door to effect its movement along the guide, a reservoir, a manually operated pump having its inlet connected to the reservoir, a reversing valve connected to the outlet of the pump and providing for alternate connection of either end of the cylinder to the outlet of the pump and of the other end to the reservoir.

2. A bath as in Claim 1, wherein the pump is provided with a pivoted operating lever extending above the rim of the bath.

3. A bath as in Claim 1 or Claim 2, wherein setting means for the reversing valve extend above the rim of the bath.

4. A bath as in any of Claims 1 to 3, wherein the manually-operated and controlled hydraulic system is formed as a unit, fitted between the front of the bath proper and the front panel of the bath.

5. A bath provided with a sliding door, substantially as hereinbefore described with reference to the accompanying drawings.

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